



UK KIDNEY ASSOCIATION AND  
CENTRE FOR SUSTAINABLE HEALTHCARE  
GROUP SCHOLAR PROGRAMME

2022/23 SUMMARY REPORT

CENTRE FOR SUSTAINABLE HEALTHCARE

December 2023

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## SUMMARY

The Kidney Care Sustainability Scholars Programme – a partnership between UKKA and CSH - was designed to equip a group of motivated members of the multi-disciplinary team as future leaders for sustainability.

Twelve potential scholarships were available and in October 2022, six scholarships were started by kidney care staff across the UK. The aim was that each UKKA Sustainability Scholar be supported with protected time by their employer for one day per week to work on a sustainability project over the course of twelve months.

The scholars were managed by CSH as an action learning set, receiving on-line training (three courses) and materials, web-based networking tools, online case libraries and a sustainability in quality improvement (SusQI) toolkit, plus group and individual support. Using their protected one day per week, the Scholars undertook applied projects in sustainable service development. Five scholarships were completed in October 2023, with some projects ongoing and one awaiting data collection.

Collectively, scholars demonstrated work towards each of CSH's four principles of sustainable healthcare: prevention, patient/public empowerment, lean pathways and lower carbon swaps.

Principles of sustainable healthcare	Dialysis Acid Concentrate	Patient Pathway in Peritoneal Dialysis	Carbon Footprinting Patient Pathways	Establishing Recycling	Online Priming	Dialysing Nearer to Home
Prevention	√					√
Patient/public empowerment		√	√			√
Lean pathways		√	√			√
Lower carbon swaps	√	√		√	√	

Scholars were taught the apply, where appropriate, the sustainable value equation and the triple bottom line:

$$\text{Value} = \frac{\text{Outcomes for patients and populations}}{\text{Environmental + social + financial impacts (the 'triple bottom line')}}$$

## INTRODUCTION

Climate change is the single biggest health threat facing humanity<sup>1</sup>. In addition to climate change, the integrity of our environment, on which we depend, is threatened by pollution (air, plastic and chemical pollution), water scarcity, soil degradation, deforestation, and loss of biodiversity.

Whilst healthcare systems have a key part to play in maintaining health in the face of the threat of climate change, the delivery of healthcare is also undermining the health of our populations, by contributing to the problem. If healthcare were a country, it would be the 5<sup>th</sup> largest carbon emitter in the world<sup>2</sup>. However, addressing the magnitude of the impacts of climate change can also be viewed as 'the greatest global health opportunity'<sup>3</sup>.

Clinicians have intimate knowledge of a vast range of medications, resources and equipment used for their daily practice to provide best, evidence-based care for their patients. Non-clinical teams are also essential to ensure that resources and patient care pathways are effective. The combined knowledge and understanding across of all aspects of care is vital when making the carefully nuanced decisions on how to maintain or improve clinical care whilst reducing environmental, social and financial cost.

A CSH Scholar is a health professional or health service manager who can commit discretionary and allocated time to work on a sustainability project over the course of a year. Scholars are supported by CSH through a range of in-house resources including training courses and materials, web-based networking tools, online case libraries, and a sustainability in quality improvement (SusQI) toolkit. Supported by local and CSH sponsors, this professional development programme enables scholars to explore a sustainability topic of their choice, and where appropriate develop, run and measure projects that add sustainable value within their service, by considering the 'triple bottom line' of reduced environmental harm, reduced financial waste, and adding social value.

Participating NHS organisations provided a Local Sponsor and one protected day per week for scholars to study/work on their project.

The aims of the UKKA/CSH Sustainable Kidney Care Group Scholar Programme were to:

- create a community of practice and increase knowledge about sustainability challenges and solutions in healthcare
- gain strategic influence, spread good practice and grow the next generation of leaders in sustainable healthcare
- to deliver a sustainable improvement project within their area of work

#### References

1. World Health Organisation 2021 [Climate change and health \(who.int\)](#)
2. The Lancet and University College London Institute for Global Health Commission (2009). Managing the health effects of climate change, *The Lancet Commissions*, 373(6976), 1693-1733, DOI: [https://doi.org/10.1016/S0140-6736\(09\)60935-1](https://doi.org/10.1016/S0140-6736(09)60935-1)
3. Health Care Without Harm and ARUP (2019). *Health Care's Climate Footprint: How the health sector contributes to the global climate crisis and opportunities for action*. Available from: <https://noharm-uscanada.org/content/global/health-care-climate-footprint-report>
4. Welsh Government NHS Wales Decarbonisation Strategic Delivery Plan 2021. Available from: [NHS Wales decarbonisation strategic delivery plan | GOV.WALES](#)

SCHOLAR PROJECT AREAS (fuller individual scholar reports are also available)

## 1. TITLE Switching Dialysis Units to Central Acid Concentrate Delivery Systems

**SCHOLAR:** Gareth Murcutt (Renal Technical Manager, Royal Free London NHS Foundation Trust)

### Background:

Every dialysis session at the Royal Free London (RFL) currently uses a 5-litre can of 1:44 dilution acid concentrate. This totals some 110,000 sessions per year. A snapshot audit demonstrated that on average, the RFL dialysis service throws away 1/3 of every can of acid concentrate, totaling some 180,000 litres per year.

A project to investigate Central Acid Delivery (CAD) systems was started, which sees concentrate delivered by lorry in reusable 1000 litre IBC containers. This is then pumped into 5000 litre storage tanks located within the building. From here two pipes are installed that follow the route of the RO water ringmain around the dialysis unit and the concentrate is pumped through these pipes. There are connectors on the wall at each bedspace that the dialysis machine is connected to, and they just take as much concentrate as they need for the treatment. When using CAD for a treatment, there is no lifting of cans, no product to be thrown down the drain, no empty containers to get rid of and significant time saved for clinical and logistics staff.

### Specific Aims:

1. To investigate central acid concentrate delivery systems
2. To deliver two different concentrate options via CAD.

### Results:

One of the two sites had the CAD system installed and tested but it was not yet commissioned due to the regulatory requirements. When up and running, the project should significantly reduce the burden of all three components of the Triple Bottom Line whilst delivering the same life-saving dialysis treatments for the Top Line.

#### *Environmental benefit:*

Projected waste reduction - 61,231 x 5 litre HDPE cans and 101,081 litres of product currently thrown away should be eliminated. Projected GHG emissions savings of 73,500 kgCO<sub>2</sub>e per year across the two sites.

Further studies (currently embargoed as submitted for peer-reviewed publication) have also demonstrated GHG emissions savings due to reduced manufacture, delivery and predominantly, the amount of HDPE plastic required to deliver the acid concentrate. A conservative estimate of these savings is 1.2kgCO<sub>2</sub>e per dialysis session.

#### *Financial benefit:*

Projected savings of £46,497 per year on excess concentrate that the RFL currently dispose of at the end of treatments. An additional saving of at least £10,000 per year is estimated from a reduction in waste disposal costs across the two sites.

#### *Social sustainability:*

Every 6.2kg can requires a minimum of 2 lifts to get from the store onto the dialysis machine. Two lifts of ~ 2kgs are required at the end of treatment to get the 1/3<sup>rd</sup> full can into the sluice and pour away the contents. Reduction in staff lifting by >3,200 kgs per day. Staff time saving per day of 5.45 hrs, for improved patient care and recycling of other materials.

#### **Conclusion:**

The figures above demonstrate the numerous benefits that a CAD system can realise, and there is a high degree of confidence in these predictions. There is probably very little that any dialysis unit can do to achieve these savings by other means. Taken together, the simultaneous improvement on all three sections of the Triple Bottom Line should make installing CAD a very high priority for any dialysis service. This is especially true of almost any new build dialysis unit.

#### **Impact Summary:**

A peer-reviewed article is awaiting publication: *Reducing the carbon footprint for Haemodialysis treatments by changing the delivery of Acid Concentrate supplied by individual 5 litre cans to a central delivery system*. G. Murcutt (RFL), Rosie Hillson (CSH), Dr Cate Goodlad (RFL), Prof. Andrew Davenport (RFL).

Gareth's project featured in a BMJ article: [How to save £20 000 and 780 staff hours a year on a single ward—by making one climate friendly change \(bmj.com\)](#) and podcast [Planet centred care | The BMJ](#).

A sustainability calculator has been developed by Gareth and is freely available on the Centre for Sustainable Healthcare resource page (<https://networks.sustainablehealthcare.org.uk/resources/sustainability-impact-calculator>). It is hoped this will help other dialysis services to develop business cases for similar projects and support phased removal of 1:34 acid concentrate in the UK.

## **2. TITLE Examining the Impact of U-Drain on the Carbon Footprint of the Peritoneal Dialysis Pathway**

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**SCHOLAR:** Joanne Martin (Advanced Nurse Practitioner, Northern Care Alliance NHS Foundation Trust)

**TEAM MEMBERS:** Dr. Nina Brown, The Peritoneal Dialysis Team, Salford Royal Hospital NHS Trust

#### **Background:**

The focus of this project was to gain an understanding into the actual carbon footprint of the peritoneal dialysis, to identify any carbon hotspots, and assess the impact of using U-Drain rather than the traditional drain bags on the triple bottom line.

A session of automated peritoneal dialysis (APD) treatment typically produces 10-15 litres of effluent waste fluid collected in drainage bags that are positioned below the machine, generally on the floor. Subsequently these bags need to be carried to the toilet or another drainage point to be disposed. The bags have 15 litres capacity; however, patients use two bags to reduce the weight of each bag.

U-Drain is a fixed drainage system for automated peritoneal dialysis connecting the dialysis effluent outflow directly to the household drainage system. The U-Drain socket is situated next to the APD machine. The tubing used is similar in size to a TV aerial cable and is drained into a soil pipe. Each night the patient connects the APD machine waste drain line to the U-Drain socket, allowing the waste fluid to drain away throughout the night. The following day the patient removes the waste drain line from the socket and flushes the u-drain system with disinfectant, thus avoiding the need for drain bags completely.

### Specific Aims:

1. Undertake a thorough evaluation to understand the environmental impacts of the peritoneal dialysis pathway at Salford Royal-part of the Northern Care Alliance.
2. Identify opportunities for reduction that will be recognised by the renal community; specifically looking at u-drain as an opportunity to establish if carbon emissions are reduced, whilst also considering the impact of this on the triple bottom line.

### Results:

For the purposes of the report, it was assumed that there were six sessions per week of APD with 8 hours per session, using 12 litres of dialysis fluid. Also included are 15 home visits per year from the nursing team and a routine 3 monthly outpatient attendance. Routine blood tests were added in, alongside an average calculation of medication.

#### *Environmental benefit:*

The carbon footprinting process identified that the largest emission contributor comes from the dialysis fluid – making up 67% of the total footprint. Calculations demonstrated that using U-Drain rather than traditional drain bags saved 791 kgCO<sub>2</sub>e annually per patient.

#### *Financial benefit:*

Given the pricing structure of therapy it is not always straightforward to obtain a price for all items used. Looking at the whole dialysis population, financially, in general, PD costs are lower than in centre HD costs, (Perl et al., 2023), by making peritoneal dialysis accessible to a wider population by the use of U-Drain this could provide an overall cost saving.

#### *Patient outcomes:*

Since the initial pilot using the u-drain technology there has been no increase in incidence of peritonitis infection or delays in diagnosis noted.

#### *Social sustainability:*

There are many documented benefits around home therapies, often associated with greater patient autonomy and treatment satisfaction compared with in-centre modalities (Perl et al., 2023). Using u-drain could potentially make automated peritoneal dialysis a viable option for more patients. From a social perspective this could enable patients to have a home therapy when this may not have been available.

90% of patients reported that the system saved them time setting up and clearing the machine after dialysis, 80% noted a reduction in storage space required for consumables and all patients noted a reduction in non-recyclable waste requiring disposal. All patients who completed the questionnaire were very satisfied with the installation.

### Conclusion:

This project has highlighted the considerable carbon emissions associated with peritoneal dialysis, whilst also demonstrating that the u-drain system offers improvement across the triple bottom line with social, economic and financial benefits.

With the prevalence of CKD set to increase, it is impossible to disregard the environmental impact. Ensuring that addressing this is on the agenda with all stakeholders is now paramount in the future of healthcare provision, major stakeholders, policy makers and industry partners must support and encourage any innovation that can improve the environmental impact.

## 3. TITLE De-Carbonising the Care Pathway for Outpatient Peritoneal Dialysis

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**SCHOLAR:** Dr Luis de Mello (Sustainability Fellow, The Newcastle Hospitals NHS Foundation Trust)

**TEAM MEMBERS:** Dr Suren Kanagasundaram, Michael Collins, Tom Costelloe

### Background:

This study focussed on the Peritoneal Dialysis (PD) service at Newcastle Hospitals. It aims to comprehensively evaluate the environmental impact of PD delivery within Renal Services at Newcastle. A care pathway has been developed for a typical patient receiving outpatient PD, including patient travel, dialysis supplies and waste disposal. It also includes the associated environmental impact of that results from staffing the PD service (e.g. staff travel, home visits).

This study follows on from the In-Centre Haemodialysis (ICHD) project undertaken by the Green Nephrology Group at Newcastle Hospitals, with an aim to establish the carbon footprint of the entire Renal Service.

### Specific Aims:

1. Produce an accurate care pathway for the outpatient peritoneal dialysis service
2. Identify the carbon footprint of an average patient undergoing outpatient peritoneal dialysis
3. Identify aspects of the pathway that can be made more sustainable

### Results:

From the preliminary results, it appears that PD incurs a higher carbon cost than haemodialysis.

The obtaining of data has been one of the largest hurdles throughout this project and the data collection process is ongoing, including further information on waste treatment and transport. The results will be refined once supply chain data has been obtained. After positive manufacturer engagement with the ICHD project, the team is confident in obtaining this.

### Discussion:

This project is part of a larger project being completed by the Green Nephrology Group (Newcastle Hospitals), Environmental Resources Management and the Sustainable healthcare Coalition.

This project aims to complete a comprehensive review of the Renal Service at the Newcastle Hospitals Trust, including CKD management, in centre haemodialysis, peritoneal dialysis and transplantation.

### Impacts:

An online calculator will be developed for each of these modalities for use by other Renal services to identify carbon hotspots and improve the sustainability of renal services worldwide. After completion of the In Centre Haemodialysis component of the project, their online calculator was released in June 2023 with the support of the International Society of Nephrology. This can be found at [ICHDcarbon.org](http://ICHDcarbon.org)

## 4. TITLE Reviewing and Establishing Recycling Practices on a Dialysis Unit

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**SCHOLAR:** Dr Sharan Chugani (Renal Specialty Registrar, Swansea Bay University Health Board)

**TEAM MEMBERS:** Dr Aled Williams, Dr Clare Parker

### Background:

Activity from renal ward admissions that generates carbon emissions, includes clinic appointments, line insertions, biopsies, prescribed outpatient medication and renal replacement therapy. This therapy is carried out both in hospital and at home in the form of haemodialysis or peritoneal dialysis. In Swansea, there are two dialysis units attached to Morriston hospital, where the renal ward is located. In addition to this there are three satellite units in Carmarthen, Haverfordwest & Aberystwyth, but there are no recycling programs for the materials used during dialysis.

### Specific Aims:

- 1) Map the journey & pathway by which patients undertake unit haemodialysis at the West Renal dialysis unit at Morriston hospital, Swansea.
- 2) Understand and prioritise the areas in the dialysis pathway where interventions could be made to improve the sustainability of a haemodialysis session.

3) Implement a recycling program on the West Renal dialysis unit.

4) Understand the attitudes & thoughts amongst dialysis staff with regards to climate change and recycling.

## Results:

### *Patient outcomes:*

The staff on the dialysis unit ensured that the addition of recycling did not impact on the care patients received during their treatment.

### *Environmental benefit:*

- Incinerated waste from a single dialysis session from potentially recyclable consumables: 0.513kgCO<sub>2</sub>e
  - Reduction:  $(0.56\text{kg}/1000 \times 1074 \text{ kgCO}_2\text{e}) - 0.012\text{kgCO}_2\text{e} = 0.589\text{kgCO}_2\text{e}$
- Incinerated waste from a single dialysis session with what can currently be recycled: 0.888kgCO<sub>2</sub>e
  - Reduction:  $(0.211\text{kg}/1000 \times 1074 \text{ kgCO}_2\text{e}) - 0.005 \text{ kgCO}_2\text{e} = 0.222\text{kgCO}_2\text{e}$

If this is extrapolated over the 17,742 dialysis sessions roughly carried out in one year:

- Potentially recyclable waste: 10,450.44 kgCO<sub>2</sub>e reduction
- Waste actually recycled: 3,938.72 kgCO<sub>2</sub>e reduction

### *Financial benefit:*

Annual costs: Prior to recycling: £6,387.12  
Since recycling: £6,209.70

Total savings: £177.42

## Discussion

The idea of installing recycling bins on the dialysis unit was viewed as favourable by the staff and as a step towards a more sustainable unit, whilst posters in the unit demonstrated the scale of the problem facing the NHS and nephrology from a carbon emissions and waste perspective. Despite the extra work required by staff to ensure bins were correctly filled with recyclable materials, they incorporated these practices that allowed us to measure the amount of material recycled. The staff questionnaire highlighted a desire to help develop solutions towards making the unit more environmentally sustainable but a lack of knowledge about sustainability initiatives within the health board often led to any ideas being left idle. Ongoing projects in development include:

- A transition to electrically powered transport ambulances for patients to dialysis
- Moving away from using canisters of bicarbonate concentrate and installation of central concentrate. Two new dialysis units being proposed and planned for construction. These are to have central concentrate installed in the units to deliver bicarbonate directly to the dialysis machines
- Regularly reviewing patients and their medication to ensure their efficacy and that patients are not on superfluous medication

## 5a. TITLE Online Priming Haemodialysis Lines in Acute Dialysis Unit

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**SCHOLAR:** Dr Rosa Montero (Kidney Consultant, St George's University Hospitals NHS Foundation Trust)

**TEAM MEMBERS:** R Calayag (IT), Carolyn Baanag (Renal Education Nurse Lead), R Cubita (Dialysis Matron)

### Background:

In the majority of cases, haemodialysis is performed three times a week for 4 hours. Every session a 500mls bag of 0.9% normal saline (N/saline) is used to prime the dialysis lines so that there is no air in the tubing that attaches to the patient. This uses approximately 12mls of N/saline the rest of the bag is rarely used and discarded into the waste bin at the end of the session. In the instance of low blood pressure some of this fluid is used to administer this to the patient.

This project assessed the safety of online priming and whether in the case of an emergency whether bolus fluid could be given quickly via the dialysis machine. This was found to be possible with no patient safety concerns. The dialysis education nurse visited units that were using online priming and learnt this technique ensuring there were no breaches in infection control when using this.

### Specific Aims:

1) Reduce waste from unnecessary use of 0.9% normal saline 500ml bag on haemodialysis

2) Staff education for online priming

### Results:

#### *Patient outcomes:*

Patient requires less tubing to be connected to the dialysis machine therefore reducing time and risk of infection. No safety concerns. A decrease in connection time for dialysis sessions improves patient experience.

#### *Environmental benefit:*

CO<sub>2</sub>e saving for 1 person on haemodialysis per year = 809.64 kgCO<sub>2</sub>e (based on: N saline in PVC packaging 460g, N saline PVC bag 0.875kg, N saline packaging bag, PVC plastic tubing 0.100kg, Incineration factor 220; PVC = (3.39918kgCO<sub>2</sub>e/kg + 0.220 kgCO<sub>2</sub>e/kg) x (0.875 kg + 0.100 kg +0.460 kg) = 5.19kg; 3x sessions = 15.57kgCO<sub>2</sub>e per week; 52x weeks = 809.64 kgCO<sub>2</sub>e).

Minimum of 36 patients per week per year = 29,147.04kgCO<sub>2</sub>e = 29 tonnes of CO<sub>2</sub>e per year on the Acute dialysis unit as a conservative CO<sub>2</sub>e saving.

When scaled up to satellite dialysis units there is a greater reduction in PVC, less N/saline would need to be made and would avoid the need for packaging or delivery. A lifecycle assessment has not been performed that would increase the CO<sub>2</sub>e savings.

#### *Financial benefit:*

Cost of boxes of N/saline per day is £50, bringing a weekly saving of £350 and annual saving of £18,200.

#### *Social sustainability:*

Staff found the change made connection shorter and more efficient. They reported having more time to speak with patients as they were not going to get the N/saline. They also found setting up the dialysis machines took less time and they had more time to document. Patients noticed they were put on their dialysis faster and were happy knowing there was less waste in their dialysis.

### Conclusions:

Using dialysis machine dialysate for online priming avoids the need to use N/saline thereby reducing carbon emissions and waste. Online priming has been shown to be safe and has the additional benefit in allowing staff to have more time to be with patients and to do their documentation. There are health and safety benefits with the removing the need to deliver and stack boxes of N/saline.

This project illustrates how small changes result in a reduction in CO<sub>2</sub>e that can easily be adopted and scaled nationally to decrease the use of this unnecessary resource in priming lines for dialysis.

## 5b. TITLE Dialysing Nearer to Home

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**SCHOLAR:** Dr Rosa Montero (Kidney Consultant, St George's University Hospitals NHS Foundation Trust)

**TEAM MEMBERS:** R Calayag (Renal IT), L Espiritu (Dialysis Matron), R Cubita (Dialysis Matron), Finance Team

### Background:

The rising number of patients requiring dialysis has also seen an increase in the use of hospital transport for our dialysis patients to attend three times a week to our dialysis units. Renal is known to be the largest users of hospital transport. Our three satellite haemodialysis units cover different areas with transport taking up to two hours to pick patients up from their home to up to 2 hours to collect them from the unit to take them home. This project explored how to improve patient experience, increase active travel of patients to the satellite unit and reduce hospital transport.

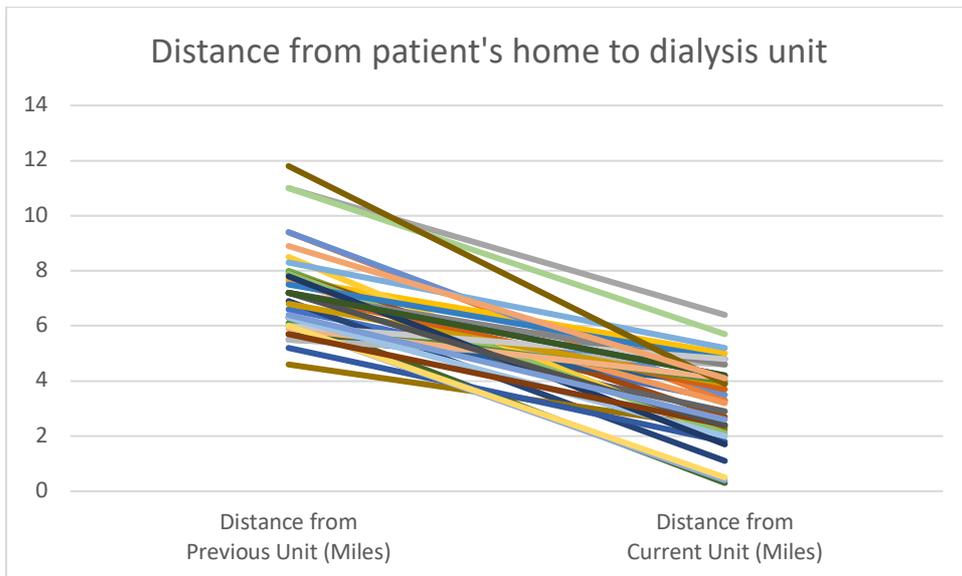
### Specific Aims:

1) Dialyse patients nearer to home thereby reducing carbon footprint due to travel

2) Encourage patients who have moved nearer to their home to use active travel or public transport to reduce hospital transport costs.

### Results:

Total number of patients transferred nearer to their unit = 39



**Patient outcomes:**

Patient satisfaction increased. No change in DNA rate as precipitated by illness/did not DNA previously, and one patient began attending full sessions. Health outcomes may be improved with reduction of polluting vehicle transporting longer distances.

**Environmental benefit:**

KgCO<sub>2</sub>e from manufacturing of transport was not included in the calculations. Total mileage saved = 151.9. Estimated carbon emissions from a Class 1 vehicle (diesel van) from tail pipe and well-to-tank emissions = 0.22875kgCO<sub>2</sub>e + 0.05572kgCO<sub>2</sub>e = 0.28447kgCO<sub>2</sub>e per mile.

Overall reduction for moving 39 people closer to home in a single centre = 0.28447kgCO<sub>2</sub>e x 151.9 miles x3 sessions per week x 52wks = 6.74 tonnes of CO<sub>2</sub>e per year.

There are 52 renal unit referring centres each with 2-5 satellite units. Moving a small number of people per centre to their nearest unit could potentially save 350 tonnes of CO<sub>2</sub>e per year showing the importance of each unit mapping the unit distance from patients' homes. Home haemodialysis would reduce CO<sub>2</sub>e transport emissions further by removing the need to travel.

**Economic benefit:**

Cost current unit travel £1517.92 (walker)  
 Cost nearest unit travel £1051.41 (walker)

Total cost current unit – cost nearest unit

Minimum Total savings: £466.51 per session for walkers x 3 sessions per week = £1399.53 x 52 weeks = £72,775.56 per year

Two walkers changed to no transport making additional savings.

Decreasing need of patients with single/double handed crew, stretcher or bariatric would increase financial savings further.

**Social sustainability:**

Total time saving: 554 minutes for 1 session. Patient feedback: 'I can spend more time with my children as I don't feel so tired on dialysis days', 'I now have a full time job, it's made such a difference', 'my husband expects me to do the dinner but although I'm nearer I still feel really tired after dialysis, it washes me out', 'I can walk there and get back home quickly, it's great I've got some of my life back'.

**Conclusions:**

This project has allowed us to improve patient experience whilst impacting positively on the environment and reducing financial spending looking at the triple bottom line. Key elements of success were the renal IT expert to map the patients and our units out, the satellite matron who asked patients and active promotion of the benefits of dialysing nearer to home by staff at the satellite units. Going forward we are maintaining waiting lists and where possible allocate people directly to their nearest unit. Every year we plan to repeat the mapping exercise to ensure the dialysis unit continues to be the one nearest to the patient.

### Impacts of Dr Montero's Scholarship:

Including the above two projects plus service improvements to waste management, going paperless, fistula on/off pack, consultation about sustainability of new renal build, education on sustainability and national sustainability leadership:

- *Patient outcomes:* Changes in service that have resulted in maintaining patient safety, improving quality of life in terms of patient travel to dialysis units.
- *Population outcomes:* Scaling up of changes across the country has more benefits by providing treatment closer to home whilst also maintaining a healthier population by informing patients how their lifestyle and disease treatment can affect the environment. Carbon calculator and public education during green week.
- *Environmental impact:* Across the different projects there has been a reduction in waste and a review of services and pathways that may implement change. Nationally looking at structures that can be modified to have a positive impact on the environment has been taken on board through working groups allowing changes to happen at scale.
- *Social impact:* Ensuring there are no health inequalities in introducing sustainable changes. Encouraging and supporting people to talk about sustainability and getting involved has health benefits, e.g. active travel, but also improves mental health and wellbeing with increasing green spaces. Empowering staff and public to make/propose changes to benefit society.
- *Financial impacts:* In the majority of cases there are changes that are cost saving or cost neutral. With those that are cost neutral being areas that could be adopted. Many small changes lead to a cumulative gain hence a bottom up approach and top down approach may lead to cost savings.

## ACKNOWLEDGEMENTS

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We wish to thank the Group Scholars' Local Sponsors, who provided time, interest, local knowledge and expertise: Aled Williams, Clare Parker, Debasish Banerjee, Dimitrios Poulikakos, Mark Harber, Nina Brown and Suren Kanagasundaram.

We thank the CSH Supervisors: Ingeborg Steinbach, Carbon Consultant; Rosie Hillson, Carbon Modelling Assistant, Catherine Floyd, Clinical Specialties Lead and Ben Whittaker, Sustainable Healthcare Delivery Lead/AHP Lead.

## CONCLUSIONS & RECOMMENDATIONS

### Conclusions:

This programme has overseen the development of five scholars working in renal units across England and Wales, out of twelve possible available scholarships initially. The main strengths of the programme have focussed on contributions from the front line to the evidence base for environmentally and socially sustainable healthcare services and accelerating innovation/adoption of sustainable practices in healthcare. Maintaining the protected time of one day per week for the scholarship was reported to be problematic for some scholars, but they reported positively on their experience: they have improved their understanding of, and confidence in, applying sustainable quality improvement. They also say they feel more motivated to undertake sustainability focused quality improvement projects in the future.

### Recommendations:

Given the continued pressure on NHS kidney care teams and difficulty for units to commit to twelve months of allocated time and support, the Centre for Sustainable Healthcare recommends a Sustainable Kidney Care Challenge, an alternative approach to generating examples of best practice akin to the [Green Surgery Challenge](#).